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APPLICATION FOR UNITED STATES PATENT

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Title: **DENTAL BRUSH FOR USE ON A ROTARY DENTAL HAND
PIECE**

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SPECIFICATION

DENTAL BRUSH FOR USE ON A ROTARY DENTAL HAND PIECE

Field of the Invention

5 The present invention refers to a dental brush for use on a dental rotary hand piece or on an electric toothbrush, and comprising a bristle field. A large number of rotary brushes used for finishing, polishing, and cleaning teeth and/or fillings are known in the art. The bristle field of
10 these brushes, which is formed of individual bristles, may be designed in various manners and may e.g. be full or only comprise crowns of bristles.

Recently, brushes have been successfully used instead of
15 rotary polishers, thereby reducing the number of operations required after diamond finishing, on one hand, and ideally allowing to use a single polishing tool for all tooth surfaces independently of their geometry or their accessibility.

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Prior Art

U.S. Pat. No. 4,020,522 and U.S. Pat. No. 4,739,532 are mentioned as examples of a crown-shaped arrangement of
25 bristles, whose length decreases from the interior to the exterior of the bristle field. Brushes of this kind are mainly used for disinfecting periodontal pockets, where the bristles must be relatively soft.

30 Brushes whose bristle fields are plane, i.e. where all bristles are cut to the same length, are also known in the art. This also applies to crown-shaped arrangements of

bristles having the same length, as marketed by the applicant of the present invention.

These arrangements of the bristles are disadvantageous in
5 that they do not reach well into spaces, and that they do not allow a complete finishing, polishing, grinding, or cleaning particularly of narrow gaps or fissures, see Fig. 1. If the bristles are close to each other, such an arrangement will result in a wedging effect in acutely
10 tapering interdental spaces and fissures in chewing surfaces.

Furthermore, WO 99/45819 discloses a toothbrush for daily use comprising, as seen in the transversal direction, a
15 bristle field composed of concavely arranged bristle bundles. *Inter alia*, this provides a better retention of toothpaste applied thereon.

Summary of the Invention

20 On the background of this prior art, it is the object of the present invention to provide a brush for use on a dental rotary hand piece or on an electric toothbrush that allows a more effective finishing, polishing, and cleaning of
25 interdental spaces and fissures in the chewing surfaces of the teeth and of fillings. This object is attained by a brush wherein the length of the bristles of the bristle field decreases from the external diameter of the bristle field to its center.

Brief Description of the Drawings

Hereinafter, the invention will be explained in more detail with reference to drawings of exemplifying embodiments.

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Fig. 1 shows an enlarged view of a brush of the prior art applied to an interdental space;

10 Fig. 2 shows a lateral, partly sectioned view of a first exemplifying embodiment of a brush of the invention;

Fig. 3 shows an alternative embodiment;

15 Fig. 4 shows an enlarged view of a brush of the invention in the position Fig. 1;

Fig. 5 shows a partially sectioned view of the brush of Fig. 2 applied to an interdental space; and

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Fig. 6 shows the brush of Fig. 5 applied to a tooth.

Detailed Description of Preferred Embodiments

25 In Fig. 1 it appears that bristles 20 cannot fully reach into the space between teeth 9 and 10 or into a fissure. In contrast thereto, as appears in Fig. 4, the bristles 5 or 7 of the brush of the invention can reach deep into the space or the fissure.

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The brush of the invention according to Fig. 2 essentially consists of fastening portion 2 for its attachment to a dental rotary hand piece or electric tooth brush and of a

brush head 3 with bristle field 4 composed of individual bristles 5. As appears in Figs. 2 and 4 to 6, the bristles of this exemplifying embodiment are arranged in the shape of a crown, and the length of the bristles decreases from the 5 external surface of the bristle field to the interior thereof, i.e. they form a concave shape.

The decrease may be linear or result in a cambered shape, i.e. spherical or according to another geometrical shape. 10 According to the intended use, individual bristles 5, which may be rounded, may comprise grinding materials, e.g. of aluminum oxide, silicon carbide, diamond, or calcium carbonate, or they may be used with a prophylactic paste. Furthermore, the bristles may be produced from different 15 materials that are known *per se*, the applied material depending on the intended use, i.e. whether rotary brush 5 will be used for prophylactics or for finishing, polishing, or grinding teeth or dental restorations, or for other applications.

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The concave shape formed by the bristles results in a less aggressive effect of the brush on soft portions such as the gums and a better adaptation to the tooth surface. In addition, an increased efficiency is obtained specifically 25 because of the rotational movement of the brush as several bristles are in planar contact.

According to Fig. 3, the bristles 7 of brush 6 may be arranged otherwise than in the shape of a crown, i.e. they 30 may be arranged in a full bristle field 8 while here also the length of the individual bristles decreases from the external surface of the bristle field towards the interior

thereof in order to form either an inwardly conical or spherical surface.

Intense tests have shown that the Use of brushes with an
5 inwardly hollow bristle field as described above yield good
results particularly for finishing, polishing, and cleaning
fissures and narrow interdental spaces, which is visible
particularly in Figs. 4 and 5 where, in contrast to a brush
of the prior art as shown in Fig. 1, the longer external
10 bristles may penetrate in a space between teeth 9 and 10 or
in a fissure without being wedged therein.

Fig. 5 further shows that the concave shape of the bristle
field is better adapted to the convex tooth surface, thereby
15 providing a better finishing, cleaning, or polishing effect.

The brushes may also be used together with commercially
available polishing pastes for professional prophylactic
applications and provide the same advantages as described
20 above. The result is a simplification of the procedure in
the sense that only one brush is required and a pointed
shape such as the small cup need not be applied. The
concave crown shape furthermore results in an increase of
the revolving speed as the crown is distanced from the
25 center of rotation, thereby providing an increased
efficiency. The concave brush may also be used for
apparatus such as electric rotary toothbrushes, e.g. for
home use.